

1. A nucleic acid comprising a codon-optimized nucleotide sequence encoding a component of a bacterial luciferase system.

2. The nucleic acid of claim 1, wherein the codon-optimized nucleotide sequence differs from a wild type nucleotide sequence that encodes the component of a bacterial luciferase system by at least one codon substitution selected from the group consisting of: TTT to TTC; TTA, CTA, TTG, and CTT to CTG or CTC; ATT and ATA to ATC; GTT and GTA to GTG or GTC; TCT, TCA, and TCG to TCC; CCA and CCG to CCC or CCT; ACT, ACA and ACG to ACC; GCA and GCG to GCT or GCC; TAT to TAC; CAT to CAC; CAA to CAG; AAT to AAC; AAA to AAG; GAT to GAC; GAA to GAG; TGT to TGC; CGT and CGA to CGC, CGG, and AGA; AGT to AGC; and GGT and GGA to GGC or GGG.

3. The nucleic acid of claim 1, wherein the component of a bacterial luciferase system comprises a LuxA polypeptide.

4. The nucleic acid of claim 3, wherein the codon-optimized nucleotide sequence is SEQ ID NO:1.

5. The nucleic acid of claim 1, wherein the component of a bacterial luciferase system comprises a LuxB polypeptide.

6. The nucleic acid of claim 5, wherein the codon-optimized nucleotide sequence is SEQ ID NO:2.

7. The nucleic acid of claim 1, further comprising a regulatory element operably linked to the codon-optimized nucleotide sequence.

8. The nucleic acid of claim 7, wherein the regulatory element comprises an enhancer.

9. A cell comprising a nucleic acid comprising a codon-optimized nucleotide sequence encoding a component of a bacterial luciferase system.

10. The cell of claim 9, wherein the cell is a mammalian cell.

11. The cell of claim 9, wherein the cell is immobilized on a substrate.

12. The cell of claim 9, wherein the codon-optimized nucleotide sequence differs from a wild type nucleotide sequence that encodes the component of a bacterial luciferase system by at least one codon substitution selected from the group consisting of: TTT to TTC; TTA, CTA, TTG, and CTT to CTG or CTC; ATT and ATA to ATC; GTT and GTA to GTG or GTC; TCT, TCA, and TCG to TCC; CCA and CCG to CCC or CCT; ACT, ACA and ACG to ACC; GCA and GCG to GCT or GCC; TAT to TAC; CAT to CAC; CAA to CAG; AAT to AAC; AAA to AAG; GAT to GAC; GAA to GAG; TGT to TGC; CGT and CGA to CGC, CGG, and AGA; AGT to AGC; and GGT and GGA to GGC or GGG.

13. The cell of claim 9, wherein the component of a bacterial luciferase system comprises a LuxA polypeptide.

14. The cell of claim 13, wherein the codon-optimized nucleotide sequence is SEQ ID NO:1.

15. The cell of claim 9, wherein the component of a bacterial luciferase system comprises a LuxB polypeptide.

16. The cell of claim 15, wherein the codon-optimized nucleotide sequence is SEQ ID NO:2.

17. The cell of claim 9, wherein the codon-optimized nucleotide sequence is operably linked to a regulatory element.

18. The cell of claim 17, wherein the regulatory element comprises an enhancer.

19. A method comprising the step of introducing into a mammalian cell a nucleic acid comprising a codon-optimized nucleotide sequence encoding a component of a bacterial luciferase system.

20. The method of claim 19, wherein the codon-optimized nucleotide sequence differs from a wild type nucleotide sequence that encodes the component of a bacterial luciferase system by at least one codon substitution selected from the group consisting of: TTT to TTC; TTA, CTA, TTG, and CTT to CTG or CTC; ATT and ATA to ATC; GTT and GTA to GTG or GTC; TCT, TCA, and TCG to TCC; CCA and CCG to CCC or CCT; ACT, ACA and ACG to ACC; GCA and GCG to GCT or GCC; TAT to TAC; CAT to CAC; CAA

to CAG; AAT to AAC; AAA to AAG; GAT to GAC; GAA to GAG; TGT to TGC; CGT and CGA to CGC, CGG, and AGA; AGT to AGC; and GGT and GGA to GGC or GGG.

21. The method of claim 19, wherein the component of a bacterial luciferase system comprises a LuxA polypeptide.

22. The method of claim 21, wherein the codon-optimized nucleotide sequence is SEQ ID NO:1.

23. The method of claim 19, wherein the component of a bacterial luciferase system comprises a LuxB polypeptide.

24. The method of claim 23, wherein the codon-optimized nucleotide sequence is SEQ ID NO:2.

25. The method of claim 19, wherein the codon-optimized nucleotide sequence is operably linked to a regulatory element.

26. The method of claim 25, wherein the regulatory element comprises an enhancer.